CRITICAL AREA PLANTING

(Acre)
Code 342

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

Planting vegetation, such as trees, shrubs, vines, grasses, forbs, or legumes on highly erodible or critically eroding areas.

II. Purposes

The purposes of this practice are to revegetate bare soils and stabilize eroding sites.

III. Conditions Where Practice Applies

This practice applies to sites where bare soils and erosion are found in conjunction with agriculture, construction, forestry, mining, and wetland restoration activities and where natural revegetation is unlikely to occur.

This practice does not apply to tree planting mainly for wood products.

IV. Federal, State and Local Laws

Critical area planting practices shall comply with all federal, state and local laws, rules or regulations. The operator is responsible for securing required permits. This standard does not contain the text of the federal, state or local laws.

V. Criteria

A. Site Assessment

A site assessment shall be conducted, documented, and incorporated into the design. The assessment shall be performed to determine physical site characteristics that will influence the appropriate seeding mixture and establishment procedures. The site assessment shall include evaluation of: soil characteristics, aspect, slope, exposure to sunlight, proximity to natural plant communities, proximity to nuisance, noxious and/or invasive species, site history, moisture regime, climatic patterns, soil fertility, and previous herbicide applications.

B. Site Preparation

Site preparation activities shall include:

1. Slope Stabilization

   Grade to a stable slope when shaping. For slopes steeper than 2H:1V, special practices such as *soil bioengineering*[1] may be required. These practices shall follow approved design procedures located in the NRCS Engineering Field Handbook (EFH), Chapter 18. Eliminate all overfalls. The toe of the slope, or the outlet of the concentrated flow channel, shall be stable before attempting seeding on the slope. In some cases, concentrated flow may need to be diverted during establishment period.

2. Topsoiling

   A minimum of 4 in. of friable soil material or topsoil shall be added and mixed to exposed rocky, sandy, gravelly, shaley material, or extremely fine textured subsoil.

3. Seedbed Preparation

   Do not use conventional tillage where desirable vegetation is already present or where the site is environmentally sensitive.

   During recommended seeding periods seedbed preparation shall immediately follow construction activities. For seeding outside recommended seeding periods other erosion control methods such as applying mulch or seeding temporary cover, shall be performed. Seedbed preparation methods include:

   a. Conventional Tillage

      Prepare a tilled, fine, but firm seedbed. The seedbed shall contain enough fine soil particles for uniform shallow

[1]Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

coverage of the seed and contact with moisture and nutrients.

When preparing a site for *native species*, it is important to have a firm seedbed. Cultipack or roll before and after seeding if broadcast.

b. No-Till

Control existing vegetation through mowing, burning, or herbicide application. If desirable species are present, consider spot treatment to control unwanted species.

4. Fertilization

a. When using introduced species on dry, dry-mesic, and mesic sites, ensure proper pH and fertility. In lieu of soil testing, apply a minimum of 150 lbs. Of 20-10-10, and 2 tons of 80-85 lime or equivalent.

b. For native species, fertilizer and lime are not recommended.

C. Seeding

1. Seed Selection

Seeding rates are based on pounds or ounces of *Pure Live Seed (PLS)* per acre. Where seed germination and purity can not be assured, a waiver will be required from the State Agronomist.

Use *introduced species* only in places where they will not spread into existing natural areas. For example, a dam is constructed in the middle of a pasture that is composed of bluegrass, quackgrass and smooth brome grass. Since abundant introduced species surround the dam, it could be seeded with either the standard mesic native mixture composed of native species or introduced species mix #6, which is composed of introduced species. Another example is if an embankment is constructed as part of a wetland restoration which is adjacent to an existing natural wetland. Introduced species would grow in this location, but due to the presence of the natural wetland, the embankment shall be seeded with a native species mix.

a. Seed Mixtures - **Native Species**

Where available, local *genotype* species are preferred. Refer to Agronomy Technical Note 5 and the following guidelines to develop your seed mixture, considering cost and availability of seed. Example seed mixtures are shown in Table 4.

(1) *Dry, dry-mesic,* and *mesic sites*

For these mixtures select: 4 grasses (a minimum total of 80 oz. (5 lb.)/acre of grass seed, each grass to be seeded at a minimum of 8 oz./acre), plus 5 forbs, including 1 legume. Forbs must be seeded at a minimum of 6 seeds/ft^2. This guideline should result in a mixture containing a minimum of 30 seeds/ft^2.

(2) *Wet-mesic* and *wet sites*

Seed mixtures may be developed from Agronomy Technical Note 5 using the following guidelines. For seeding at these sites, select 8 species, with a minimum of 3 from forbs and 3 from grass/sedge/rush. Apply a minimum of 16 oz. PLS per acre.

b. Seed Mixtures - **Introduced Species**

Plant mixtures that are potentially invasive and harmful to native plant communities shall be evaluated prior to seeding. See Table 5 for standard seeding mixtures for introduced species. See Table 6 for guidelines for custom seeding mixtures for introduced species. When designing a custom mixture, 50% of the mixture must be grass.

2. Concentrated Flow Channels

For dry, dry-mesic, and mesic sites seed introduced species. For wet-mesic sites, consider using native species. For wet sites use native species.

3. Inoculation

Legume seed shall be inoculated in accordance with the manufacturer's recommendations. When seeding with a hydroseeder, the amount of inoculant shall be increased 5 times the

recommended rate. Inoculant shall not be mixed with liquid fertilizer.

4. Methods - Seed grasses and legumes no more than ¼ in. deep. Distribute seed uniformly. Mixtures with low seeding rates require special care in sowing to achieve proper seed distribution. Seed may be broadcast or drilled, as appropriate for the site. If drilled, proper calibration is essential.

5. Seeding Dates - Tables 1 and 2 show typical dates for normal seasons. Specific seasonal conditions may require adjustments to the seeding dates. Date of seeding is a critical factor in determining whether a seeding will succeed or fail. The specific date that provides the best chance for success will vary from year to year with prevailing moisture and temperature conditions. Planting at either end of the allowable range is riskier than the middle of the range. See Figure 1 for planting zones.

    a. Native Specie Summer Seeding

        Seeding may occur after the Spring Seeding dates if adequate moisture is present for germination and early seedling growth. Mulching is required during this time period. Field moisture evaluations must be documented in the case file. Seeding is not allowed after the end date for Late Summer Seeding from Table 1. This gives the plants 6 weeks of growth before the median date of the first killing frost.

    b. Introduced Specie Summer Seeding

        Seeding may occur between the spring and late summer dates shown in Table 2 if adequate moisture is present for germination and early seedling growth. Mulching is required during this time period. Field moisture evaluations must be documented in the case file.

Figure 1

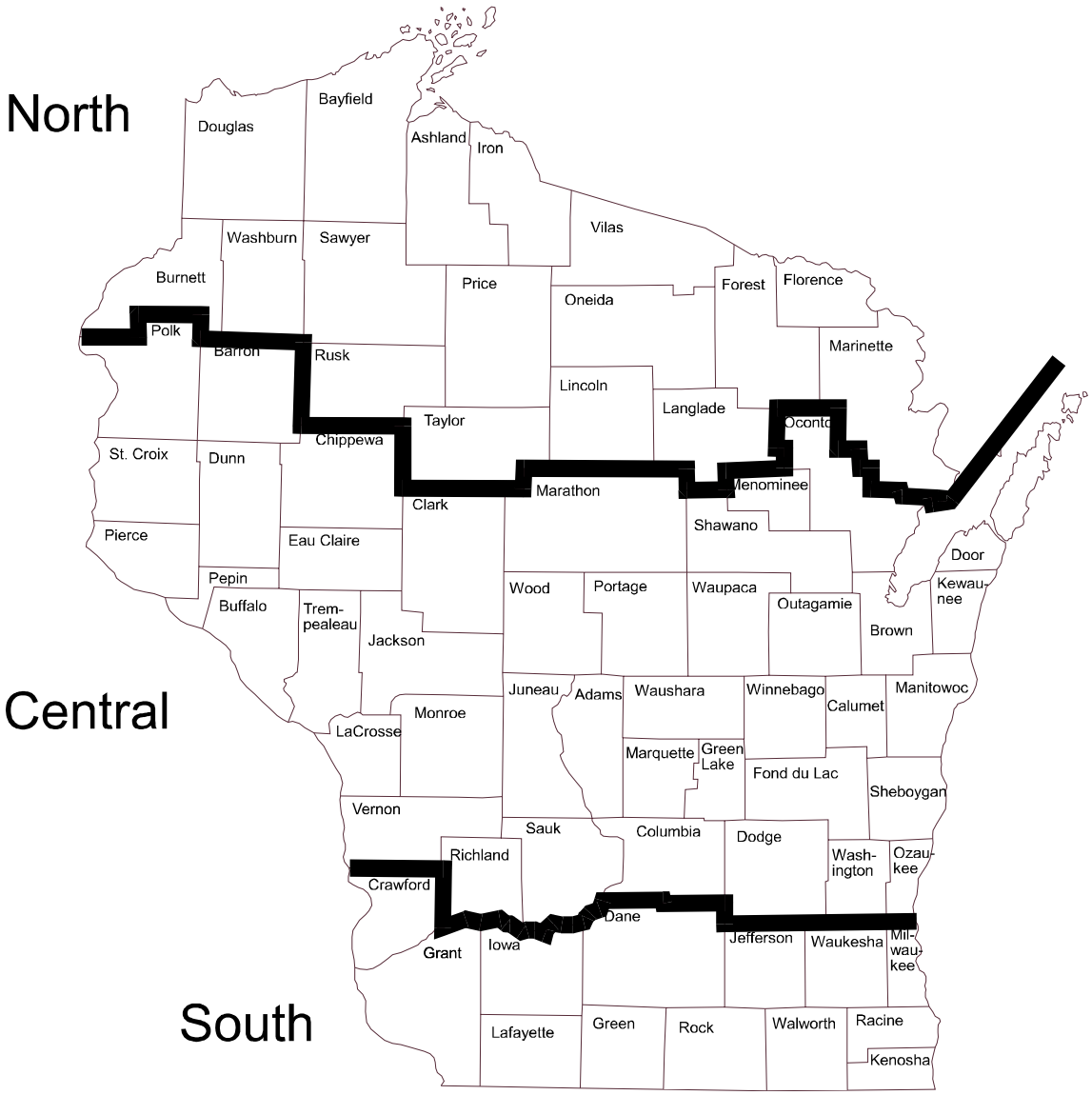
North
Central
South
Douglas
Bayfield
Ashland
Iron
Washburn
Sawyer
Vilas
Burnett
Price
Oneida
Forest
Florence
Polk
Barron
Rusk
Marinette
Lincoln
Langlade
Taylor
Oconto
St. Croix
Dunn
Chippewa
Clark
Marathon
Menominee
Shawano
Pierce
Eau Claire
Door
Pepin
Wood
Portage
Waupaca
Outagamie
Kewaunee
Buffalo
Trempealeau
Jackson
Brown
Juneau
Adams
Waushara
Winnebago
Calumet
Manitowoc
Monroe
LaCrosse
Marquette
Green Lake
Fond du Lac
Sheboygan
Vernon
Sauk
Columbia
Dodge
Richland
Washington
Ozaukee
Crawford
Dane
Grant
Iowa
Jefferson
Waukesha
Milwaukee
Lafayette
Green
Rock
Walworth
Racine
Kenosha

Table 1
Seeding Date/Ranges for Native Mixtures

	Spring Seeding	Fall Dormant Seeding
Northern Zone	Thaw - 7/15	10/8 - Snow Cover
Central Zone	Thaw - 6/30	10/15 - Snow Cover
Southern Zone	Thaw - 6/30	11/1 - Snow Cover

Table 2
Seeding Date Ranges for Introduced Grasses and Legumes

	Spring	Late Summer
North	5/1 - 6/15	7/15 - 8/10
Central	4/15 - 6/1	8/1 - 8/21
South	4/1 - 5/15	8/7 - 8/29

a. Dormant Seeding

Dormant seeding for introduced specie plantings occur when construction is completed and seedbeds are prepared between the end of the late summer seeding period and November 1. Seeding will be done after November 1. These seeding dates are risky. A split application of seed may also be made, using half in November and the balance in the early spring.

b. Frost Seeding

Frost seeding is only available for introduced specie plantings. Frost seeding is sowing the seed on the soil surface that has been made friable by freezing and thawing. The soil surface is usually "honeycombed" with small cracks. These seeding are made beginning in late February and March in the south through mid April in the north. Seeding is on seedbeds which were prepared in the fall and were limed, fertilized, and mulched according to needs, and where a fall seeding of an annual crop may have been established for temporary protection. No further seedbed preparation is required. Frost seeding shall not be made on areas covered with ice or snow. Do not frost seed into winter wheat or winter rye.

6. Companion Crop

Where erosion is a concern, a companion crop or mulching will be used.

a. For Introduced Mixtures

Oats, barley, winter wheat, rye, or spring wheat shall be seeded at the rate of 1½ bushels/acre in the spring or fall. -Annual rye grass may be used in lieu of small grain at the rate of 3 lb/acre. With the exception of annual ryegrass, the companion crop shall be mowed before heading. Mow 8 - 10 in. high to avoid harm to the permanent seeding.

b. For Native Mixtures

Where planting a companion crop, use a mixture which contains: Canada Wild Rye (Elymus canadensis), seeded at 1-2 lbs. PLS/acre or Side-oats Grama (Bouteloua curtpendula), seeded at 1-2 lbs. PLS/acre, or Oats (Avena sativa) seeded at ½ bushel/acre (spring only).

7. Temporary Cover Crop

Areas needing protection during periods when permanent seedings are not made shall be seeded to annual species for temporary protection. See Table 3 for seeding rates. The residue from this crop may either be incorporated into the soil during seedbed preparation at the next permanent seeding period or left on the soil surface and the planting made as a no-till seeding or frost seeding. Do not seed temporary covers after October 15 in the southern and central zones and October 1 in the northern zone.

Table 3
Temporary Cover Crop

Species	Rate/Acre
Oats	3 bushels
Corn (drilled)	3 bushels
Sudangrass	35 pounds
Cereal Rye[1]	2 bushels
Winter Wheat[1]	2 bushels
Annual Ryegrass	25 pounds

[1] Rye and winter wheat will be destroyed by seedbed preparation at next permanent seeding period.

8. Mulching

   Construction that exposes sand, gravel, or rocky material shall be mulched after seeding. Steep areas that are topsoiled shall be mulched. After the seeding period has passed, mulch shall be applied for protection on all disturbed areas subject to erosion. If companion or temporary cover crops are being used, mulching may not be necessary unless site conditions dictate the use. Mulch shall be applied following criteria outlined in NRCS Field Office Technical Guide (FOTG) Section IV, Standard 484, Mulching.

9. Protection

   Protect all critical area plantings from animals and traffic (vehicle or foot) during the establishment period. In some cases, silt fences and/or erosion control matting/netting may be needed to protect the seeding.

VI. Considerations

A. Consider seeding at a lower rate and making 2 passes to ensure adequate coverage. Check seed boxes regularly to ensure even distribution.

B. Heavy traffic and/or compacted soil areas may need special site preparation prior to seeding.

C. Sprigs, root stocks, crowns, cones, culms, and sod may be considered where appropriate.

D. Woody shrubs or trees may be used only after initial stabilization. Plant in accordance with the purpose of the planting. See NRCS FOTG Section IV, Standard 612 - Tree Planting, Standard 562 - Recreation Area Improvement, Standard 580 - Streambank and Shoreland Protection, and the DNR Interim Best Management Practice Shoreline Habitat Restoration for Developed Areas. Also see NRCS Engineering Field Handbook, Chapter 16, Streambank and Shoreline Protection and Chapter 18, Soil Bioengineering for Upland Slope Protection and Erosion Reduction.

E. Consider using carriers such as vermiculite, sawdust, and soybean meal to increase volume and weight for uniform distribution.

F. Consider limited or no use of herbicides one year prior to seeding. If herbicides must be used, be sure there is no potential for carryover.

VII. Plans and Specifications

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Consideration, and Operation and Maintenance sections described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

VIII. Operation and Maintenance

A. Noxious weeds and other undesirable species must be controlled at all sites. During the first year, mow native plantings at 30-day intervals or when weeds are 18”-24” high. Mowing height should range from 6”-12”. Spot spraying or hand pulling may be needed for some noxious species such as Thistles and Purple loosestrife.

B. Sites may require periodic maintenance consisting of mowing, burning, or herbicide treatment.

C. Sites should be inspected periodically to ensure objectives are being met.

IX. References

Curtis, J. T. 1959. *The Vegetation of Wisconsin: an ordination of plant communities.* University of Wisconsin Press, Madison, Wisconsin, 657pp.

Henderson, R. A. 1995. *Plant Species Composition of Wisconsin Prairies: an Aid to Selecting Species for Plantings and Restorations Based Upon University of Wisconsin-Madison Plant Ecology Laboratory Data.* Wisconsin Department of Natural Resources Technical Bulletin No. 188.

Ladd, D. and Oberle, F. 1995. *Tallgrass Prairie Wildflowers, A Field Guide*. The Nature Conservancy.

Nichols, S. and Entine, L. 1976. *Prairie Primer.* University of Wisconsin - Extension, publication G2736, 44pp.

Packard, S. and Mutel, C. 1997. *The Tallgrass Restoration Handbook for Prairies, Savannas and Woodlands*. Society for Ecological Restoration, 463pp.

Rock, H. W. 1971. *Prairie Propogation Handbook.* Boerner Botanical Gardens, 60pp.

United States Department of Agriculture - Natural Resources Conservation Service. Engineering Field Handbook, Chapters 16 and 18.

United States Department of Agriculture - Natural Resources Conservation Service-Wisconsin, Agronomy Technical Note 5.

United States Department of Agriculture - Natural Resources Conservation Service. Wisconsin Field Office Technical Guide, Section IV, Standards 612, 562, and 484.

X. Definitions

Soil Bioengineering (V.B.1) Practice of combining mechanical, biological and ecological concepts to arrest and prevent shallow slope failures and erosion.

Dry Prairies (V.C.1.a.(1)) Dry Prairies occur mostly on somewhat excessively drained and excessively drained soils. This would include soils such as; Sparta, Impact and Plainfield.

Dry-Mesic Prairies (V.C.1.a.(1)) Dry-Mesic prairies are transitional prairies between Dry Prairie and Mesic Prairie. They occur on some somewhat excessively drained and some well drained soils. Examples of Dry-Mesic soils would include Billett, Dickinson and Rassett.

Genotype (V.C.1.a) A group of individual plants which share a specified genetic makeup. For example, all big bluestem plants that are genetically adapted to grow and mature in the climatic conditions found in the driftless region could be considered a genotype.

Introduced Species (V.C.1.) Plant species that historically would not have been found in North America until they were brought here by travelers from other parts of the world. This would include smooth bromegrass and alfalfa. Some of these species may have a wide distribution such as Kentucky bluegrass.

Mesic Prairie (V.C.1.a.(1)) Mesic Prairies will be found on most moderately well and well drained soils which have moderate to very high Available Water Capacity. Mesic Prairies also occur on some somewhat poorly drained soils with low or very low available water capacity or perched water tables. Mesic prairies would be expected on soils such as; Markham, Varna, Parr, Plano, Dresden, Warsaw, Tama, and Downs.

Native Species (V.B.3.a.) Plants species that historically would have been found growing in North America such as Big bluestem or Green needle-grass.

Pure Live Seed (PLS) (V.C.1.) A relative value representing the quality of the seed of a given specie. PLS is calculated by multiplying the percent germination times the percent purity.

Wet-Mesic Prairie (V.C.1.a.(2)) Wet-Mesic prairies are transitional between Wet Prairie and Mesic Prairie. Most Wet-Mesic Prairies occur on somewhat poorly drained soils. Wet-Mesic Prairies would occur on soils such as Beecher, Elliott, Lamartine, Locke, Elburn, Kane, Matherton, Muscatine, Curran and Rawley.

Wet Prairie (V.C.1.a.(2)) Wet prairies occur on soils with poor and very poor drainage. They can also be found on some frequently flooded sites. Wet prairies can be found on soils such as; Ashkum, Barry, Brookston, Ossian, Pella, Sebewa, Garwin and Ettrick.

Table 4 - Example Seeding Mixtures for Native Species [1]

Site Type	Common Name	Genus and species	Plant Type	Seeding Rate in oz/acre PLS
Dry	Little bluestem	Schizachyrium scoparium	Grass	32
	Big bluestem	Andropogon gerardii	Grass	24
	Side-oats grama	Bouteloua curtipendula	Grass	16
	Switchgrass	Panicum virgatum	Grass	8
	Sand dropseed	Sporobolus cryptandrus	Grass	4
	Rough blazing star	Liatris aspera	Forb	1
	Evening primrose	Oenothera biennis	Forb	1
	Prairie cinquefoil	Potentilla arguta	Forb	1
	Black-eyed Susan	Rudbeckia hirta	Forb	1
	Purple prairie clover	Dalea purpurea	Legume	2
Dry	Side-oats grama	Bouteloua curtipendula	Grass	24
	Little bluestem	Schizachyrium scoparium	Grass	24
	Switchgrass	Panicum virgatum	Grass	16
	Sand dropseed	Sporobolus cryptandrus	Grass	16
	Rough blazing star	Liatris aspera	Forb	1
	Spotted bee balm	Monarda punctata	Forb	1
	Black-eyed Susan	Rudbeckia hirta	Forb	0.25
	Hoary vervain	Verbena stricta	Forb	0.25
	Purple prairie clover	Dalea purpurea	Legume	3
Dry-Mesic	Side-oats grama	Bouteloua curtipendula	Grass	20
	Little bluestem	Schizachyrium scoparium	Grass	20
	Big bluestem	Andropogon gerardii	Grass	16
	Indian grass	Sorgastrum nutans	Grass	16
	Switchgrass	Panicum virgatum	Grass	8
	Sand dropseed	Sporobolus cryptandrus	Grass	4
	Rough blazing star	Liatris aspera	Forb	2
	Yellow cone flower	Ratibida pinnata	Forb	1.5
	Evening primrose	Oenothera biennis	Forb	1
	Butterfly milkweed	Asclepias tuberosa	Forb	1
	Black-eyed Susan	Rudbeckia hirta	Forb	0.5
	Illinois tick trefoil	Desmodium illinoense	Legume	10
Dry-Mesic	Big bluestem	Andropogon gerardii	Grass	24
	Little bluestem	Schizachyrium scoparium	Grass	24
	Indian grass	Sorgastrum nutans	Grass	24
	Switchgrass	Panicum virgatum	Grass	8
	Heath aster	Aster ericoides	Forb	0.5
	Bergamot	Monarda fistulosa	Forb	0.5
	Black-eyed Susan	Rudbeckia hirta	Forb	0.25
	Pale spiked lobelia	Lobelia spicata	Forb	0.1
	Round-headed bush-clover	Lespedeza capitata	Legume	5

[1] Consult Agronomy Technical Note 5 and Section IV.C.1.a.(1) for guidelines for species substitution.

Table 4 (continued)

Site Type	Common Name	Genus and species	Plant Type	Seeding Rate in oz/acre PLS
Mesic	Indian grass	Sorgastrum nutans	Grass	24
	Big bluestem	Andropogon gerardii	Grass	16
	Canada wild rye	Elymus canadensis	Grass	16
	Little bluestem	Schizachyrium scoparium	Grass	16
	Switchgrass	Panicum virgatum	Grass	8
	Ox-eye Sunflower	Heliopsis helianthoides	Forb	2
	Prairie blazing star	Liatris pycnostachya	Forb	2
	Yellow cone flower	Ratibida pinnata	Forb	1.5
	Cupplant	Silphium perfoliatum	Forb	1
	Golden Alexander	Zizia aurea	Forb	1
	Prairie cinquefoil	Potentilla arguta	Forb	0.5
	Black-eyed Susan	Rudbeckia hirta	Forb	0.5
	Evening primrose	Oenothera biennis	Forb	0.25
	Purple prairie clover	Dalea purpurea	Legume	1.5
	Canada milk vetch	Astragalus canadensis	Legume	1
Mesic	Big bluestem	Andropogon gerardii	Grass	24
	Indian grass	Sorgastrum nutans	Grass	24
	Switchgrass	Panicum virgatum	Grass	16
	Little bluestem	Schizachyrium scoparium	Grass	16
	New England aster	Aster novae-angliae	Forb	1
	Bergamot	Monarda fistulosa	Forb	1
	Yellow cone flower	Ratibida pinnata	Forb	1
	Black-eyed Susan	Rudbeckia hirta	Forb	0.5
	Purple prairie clover	Dalea purpurea	Legume	2.5
Wet-Mesic	Indian grass	Sorgastrum nutans	Grass	26
	Big bluestem	Andropogon gerardii	Grass	26
	Canada wild rye	Elymus canadensis	Grass	18
	Switchgrass	Panicum vergatum	Grass	8
	Fowl mannagrass	Glyceria striata	Grass	1
	Prairie cordgrass	Spartina pectinata	Grass	1
	Cupplant	Silphium perfoliatum	Forb	2
	Yellow cone flower	Ratibida pinnata	Forb	1.5
	Golden Alexander	Zizia aurea	Forb	1
	Bergamot	Monarda fistulosa	Forb	1
	Boneset	Eupatorium perfoliatum	Forb	0.5
	Black-eyed Susan	Rudbeckia hirta	Forb	0.6
	Common Ironweed	Vernonia fasciculata	Forb	0.5
	Sawtooth sunflower	Helianthus grosseserratus	Forb	0.1
	Canada milk vetch	Astragalus canadensis	Legume	3
Wet-Mesic	Big Bluestem	Andropogon gerardii	Grass	16
	Switchgrass	Panicum virgatum	Grass	8
	Little Bluestem	Schizachyrium scoparium	Grass	18
	Prairie Dropseed	Sporobolus heterolepis	Grass	20
	Canada Wild Rye	Elymus canadensis	Grass	18
	Yellow Coneflower	Ratibida pinnata	Forb	1.5
	Blue Vervain	Verbena hastata	Forb	1
	Prairie Blazing Star	Liatris pycnostachya	Forb	3
	Virginia Mt. Mint	Pycanthemum virginianum	Forb	1
	Prairie Dock	Silphium terebinthinaceum	Forb	2
	New England Aster	Aster novae-anglia	Forb	1
	Bergamot	Monarda fistulosus	Forb	1
	Black-eyed Susan	Rudbeckia hirta	Forb	0.5
	Showy Tick Trefoil	Desmodium canadense	Legume	1
	White Wild Indigo	Baptesia lactea	Legume	2

Table 4 (continued)

Site Type	Common Name	Genus and species	Plant Type	Seeding Rate in oz/acre PLS
Wet	Rice Cutgrass	Leersia oryzoides	Grass	2
	Prairie Cordgrass	Spartina pectinata	Grass	2
	Fowl Mannagrass	Glyceria striata	Grass	2
	Wool Grass	Scirpus cyperinus	Sedge	1
	Fox Sedge	Carex vulpinoidea	Sedge	2
	Great Blue Lobelia	Lobelia siphilitica	Forb	0.5
	Joe-Pye Weed	Eupatorium maculatum	Forb	2
	Blue Vervain	Verbena hastata	Forb	2
	Sneezeweed	Helenium autumnale	Forb	1
	Marsh Milkweed	Asclepias incarnata	Forb	2
	Spotted Touch-me-not	Impatiens capensis	Annual	2
Wet	Canada Bluejoint	Calamagrostis canadensis	Grass	1.5
	Giant Mannagrass	Glyceria grandis	Grass	3
	Virginia Wild Rye	Elymus virginicus	Grass	16
	Awl-fruited Sedge	Carex stipata	Sedge	2
	Common Rush	Juncus effusus	Rush	1
	Great St. Johns Wort	Hypericum pyramidatum	Forb	0.5
	Nodding Beggarstick	Bidens coronata	Forb	1
	Blue Vervain	Verbena hastata	Forb	2
	Culver's Root	Veronicastrum virginicum	Forb	0.25
	Virginia Mt. Mint	Pycanthemum tenuifolium	Forb	1
	Boneset	Eupatorium perfoliatum	Forb	2

Table 5
Example Seeding Mixtures for Introduced Species

Mix #	Common Name	Genus & Species	Seeding Rate in lb./ac PLS
1 - Dry-Mesic and Mesic Sites	Smooth Bromegrass Creeping Red Fescue Alfalfa Red Clover	Bromus inermis Festuca rubra Medicago sativa Trifolium pratense	10 3 3 3
2 - Dry-Mesic and Mesic Sites	Smooth Bromegrass Alfalfa	Bromus inermis Medicago sativa	15 3
3 - Mesic Sites	Smooth Bromegrass Creeping Red Fescue Kentucky bluegrass Birdsfoot trefoil	Bromus inermis Festuca rubra Poa pratensis Lotus corniculatus	5 2 2 2
4 - Mesic Sites	Smooth Bromegrass Creeping Red Fescue	Bromus inermis Festuca rubra	15 2
5 - Mesic Sites	Kentucky Bluegrass Creeping Red Fescue	Poa pratensis Festuca rubra	4 3
6 - Mesic Sites	Smooth Bromegrass Timothy Red Clover OR Alsike Clover OR Birdsfoot trefoil	Bromus inermis Phleum pratense Trifolium pratense Trifolium hybridum Lotus corniculatus	14 1 2 1 2
7 - Wet Mesic Sites	Redtop Timothy Red Clover	Agrostis alba Phleum pratense Trifolium pratense	1 2 5
8 - Wet Sites	Redtop Alsike Clover	Agrostis alba Trifolium hybridum	2 2

Table 6
Custom Seeding Mixture for Introduced Species [1]

Genus and species	Name	Plant Type	Moisture Regime	Single Species Seeding Rate (lb/ac PLS)	Deep rooted species
Bromus inermis	Smooth bromegrass	Grass	DM, M, WM	20	yes
Agrostis alba	Redtop	Grass		4	----
Festuca rubra	Creeping red fescue	Grass		5	----
Festuca rubra ssp falax	Chewings red fescue	Grass		5	----
Festuca arundinacea	Tall fescue	Grass		10	yes
Phleum pratense	Timothy	Grass		8	----
Poa pratensis	Kentucky bluegrass	Grass	M, WM	8	----
Lotus corniculatus	Birdsfoot trefoil	Legume	M, WM	6	----
Medicago sativa	Alfalfa	Legume	D, DM, M	12	yes
Trifolium hybridum	Alsike clover	Legume		3	----
Trifolium pratense	Red clover	Legume	DM, M, WM	10	----
Trifolium repens	Ladino clover	Legume	M, WM	3	----

[1] It is required that at least 50% of the custom mixture is composed of grass.

Example: A seed mixture of 50% red clover, 25% bromegrass, and 25% red fescue is desired. What would be the seeding rate of each specie in the mixture in pounds of Pure Live Seed (PLS)?

To solve this problem, take the pure stand seeding rate in PLS pounds per acre for each specie, multiply this value times the percent of that specie desired in the mixture and the answers will be the seeding rates of each specie in pounds of PLS per acre.

Specie	Pure Stand Seeding Rate (pounds/acre)	Percent in Mix	Seeding Rate Pounds PLS/acre for Mixture
Red Clover	10	50%	5
Bromegrass	20	25%	5
Red Fescue	5	25%	1.25

Total pounds PLS/acre = 11.25